

What is claimed is:

1. An organic electroluminescent element comprising a light emission layer containing a phosphorescent compound and a hole transporting layer adjacent thereto containing a hole transporting material, wherein the hole transporting material has a 0-0 band of the phosphorescence spectra of from 300 to 450 nm and has a molecular weight of not less than 550.

2. The organic electroluminescent element of claim 1, wherein the hole transporting material has an ionization potential I_{p1} of from 5.00 to 5.70 eV.

3. The organic electroluminescent element of claim 1, wherein

$$-0.1 \text{ (eV)} \leq I_{p3} - I_{p1} \leq 0.5 \text{ (eV)}$$

where I_{p1} (eV) represents the ionization potential of the hole transporting material, and I_{p3} (eV) represents the ionization potential of the phosphorescent compound.

4. The organic electroluminescent element of claim 1, wherein

$$0.5 \text{ (eV)} < T3 - E_{a1} < 1.3 \text{ (eV)}$$

where $T3$ (eV) represents the excited triplet energy level of the phosphorescent compound and E_{a1} (eV) represents the electron affinity of the hole transporting material.

5. The organic electroluminescent element of claim 1, wherein the phosphorescent compound has a phosphorescence maximum in the wavelength regions of from 380 to 480 nm.

6. The organic electroluminescent element of claim 1, further comprising a second hole transporting layer containing a second hole transporting material, the second hole transporting layer being provided on the surface of the hole transporting layer opposite the light emission layer, wherein

$$0.1 \text{ (eV)} < \text{Ip1} - \text{Ip4} < 0.7 \text{ (eV)}$$

where Ip1 (eV) represents the ionization potential of the hole transporting material, and Ip4 (eV) represents the ionization potential of the second hole transporting material.

7. The organic electroluminescent element of claim 6, wherein the thickness of the hole transporting layer adjacent to the light emission layer is from 5 to 20 nm.

8. The organic electroluminescent element of claim 1, wherein the light emission layer further contains a host compound.

9. The organic electroluminescent element of claim 8, wherein

$$0.3 \text{ (eV)} < \text{Ip2} - \text{Ip1} < 1.0 \text{ (eV)}$$

where $Ip1$ (eV) represents the ionization potential of the hole transporting material and $Ip2$ (eV) represents the ionization potential of the host compound.

10. The organic electroluminescent element of claim 8, wherein

$$0.1 \text{ (eV)} < Ea2 - Ea1 < 0.8 \text{ (eV)}$$

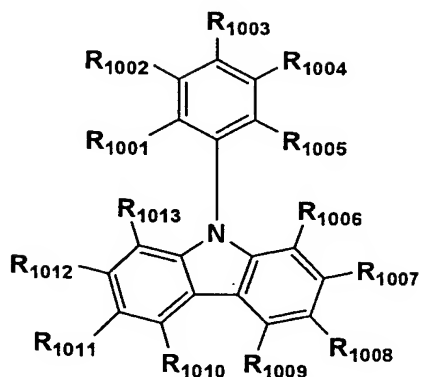
where $Ea1$ (eV) represents the electron affinity of the hole transporting material and $Ea2$ (eV) represents the electron affinity of the host compound.

11. The organic electroluminescent element of claim 8, wherein the host compound has a 0-0 band of the phosphorescence spectra of from 300 to 450 nm.

12. The organic electroluminescent element of claim 8, wherein the host compound is a carbazole derivative.

13. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 11,

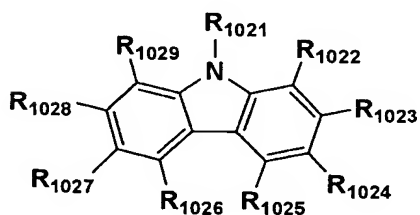
Formula 11



wherein R₁₀₀₁ through R₁₀₁₃ independently represent a hydrogen atom or a substituent, provided that at least one of R₁₀₀₁ through R₁₀₁₃ is a substituent.

14. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 12,

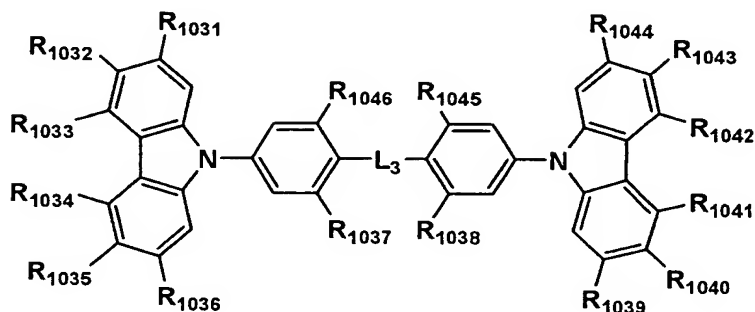
Formula 12



wherein R₁₀₂₁ represents an alkyl group, a cycloalkyl group or a fluoroalkyl group; and R₁₀₂₂ through R₁₀₂₉ independently represent a hydrogen atom or a substituent, provided that at least one of R₁₀₂₂ through R₁₀₂₉ is a substituent.

15. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 13,

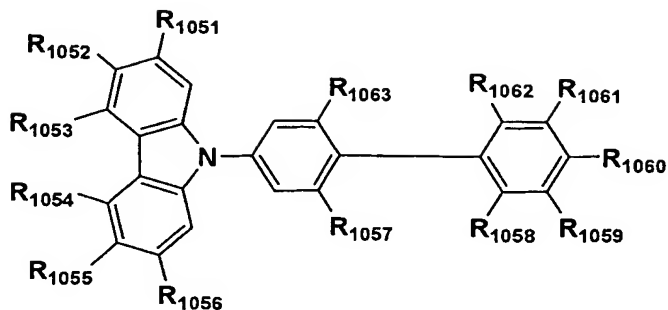
Formula 13



wherein R_{1031} through R_{1046} independently represent a hydrogen atom or a substituent; and L_3 represents a chemical bond or a divalent linkage group, provided that when L_3 represents a chemical bond, at least one of R_{1037} , R_{1038} , R_{1045} , and R_{1046} is a substituent.

16. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 14,

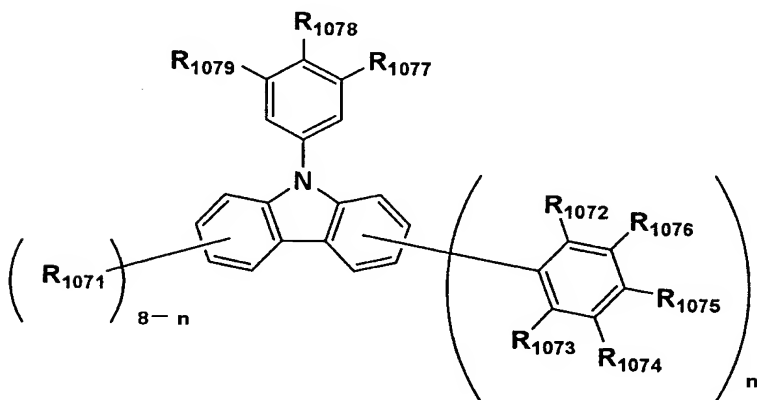
Formula 14



wherein R_{1051} through R_{1063} independently represent a hydrogen atom or a substituent, provided that at least one of R_{1057} , R_{1058} , R_{1062} , and R_{1063} is a substituent.

17. The organic electroluminescent element of claim 12, wherein the carbazole derivative is a compound represented by the following formula 15,

Formula 15

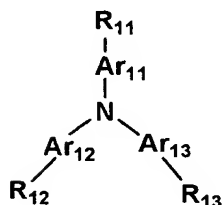


wherein R_{1071} through R_{1079} independently represent a hydrogen atom or a substituent, provided that at least one of R_{1072} and R_{1073} is a substituent; and n is an integer of from 1 to 8.

18. The organic electroluminescent element of claim 1, wherein the hole transporting material is a triarylamine compound.

19. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 1,

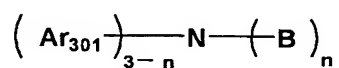
Formula 1



wherein Ar_{11} through Ar_{13} independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; and R_{11} through R_{13} independently represent a hydrogen atom or a substituent, provided that at least one of R_{11} through R_{13} is a substituent.

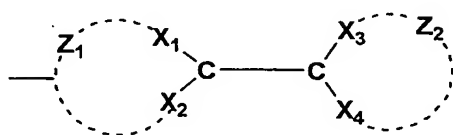
20. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 2,

Formula 2



wherein Ar_{301} represents a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; n is an integer of from 1 to 3; and B represents the following formula 3,

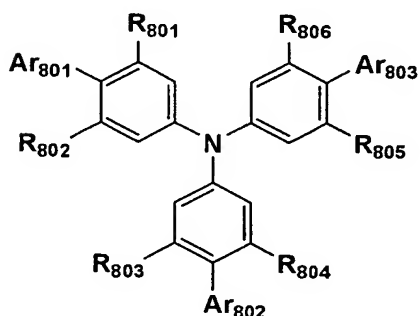
Formula 3



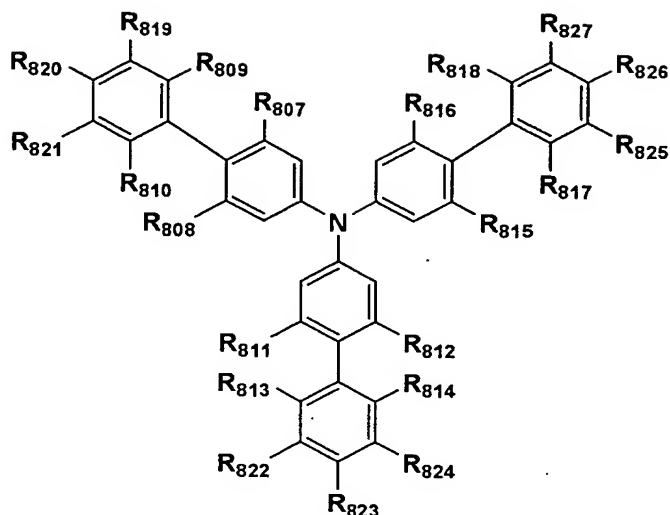
wherein Z_1 and Z_2 independently represent an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring; and X_1 through X_4 independently represent N, O, S or C- R_{301} in which R_{301} represents a hydrogen atom or a substituent, provided that at least one of X_1 through X_4 represents C- R_{301} in which R_{301} represents a substituent.

21. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 4-1 or 4-2,

Formula 4-1



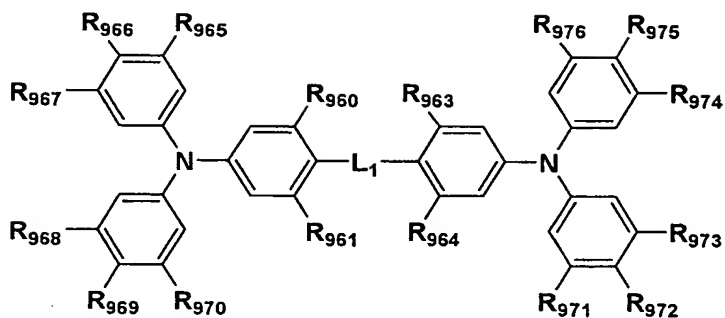
Formula 4-2



wherein Ar₈₀₁ through Ar₈₀₃ independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; and R₈₀₁ through R₈₂₇ independently represent a hydrogen atom or a substituent, provided that at least one of R₈₀₁ and R₈₀₂ is a substituent, at least one of R₈₀₃ and R₈₀₄ is a substituent, at least one of R₈₀₅ and R₈₀₆ is a substituent, at least one of R₈₀₇ through R₈₁₀ is a substituent, at least one of R₈₁₁ through R₈₁₄ is a substituent, and at least one of R₈₁₅ through R₈₁₈ is a substituent.

22. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 5,

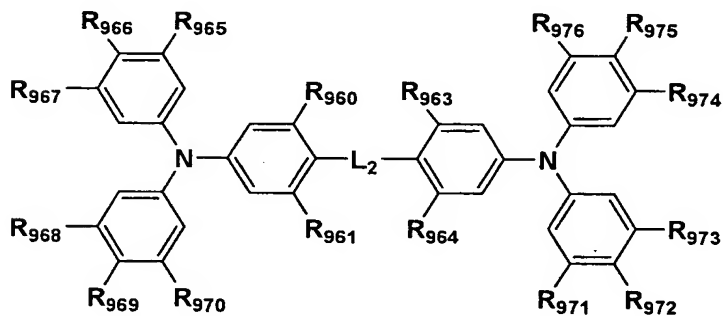
Formula 5



wherein R_{960} through R_{976} independently represent a hydrogen atom or a substituent, provided that at least one of R_{960} and R_{961} is a substituent and at least one of R_{963} and R_{964} is a substituent; and L_1 represents a chemical bond or a divalent linkage group.

23. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 6,

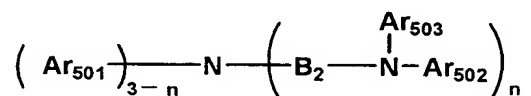
Formula 6



wherein R_{960} through R_{976} independently represent a hydrogen atom or a substituent; and L_2 represents an alkylene group, a cycloalkylene group or a fluoroalkylene group.

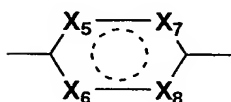
24. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 7,

Formula 7



wherein Ar_{501} through Ar_{503} independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; n is an integer of from 1 to 3; and B_2 represents the following formula 8,

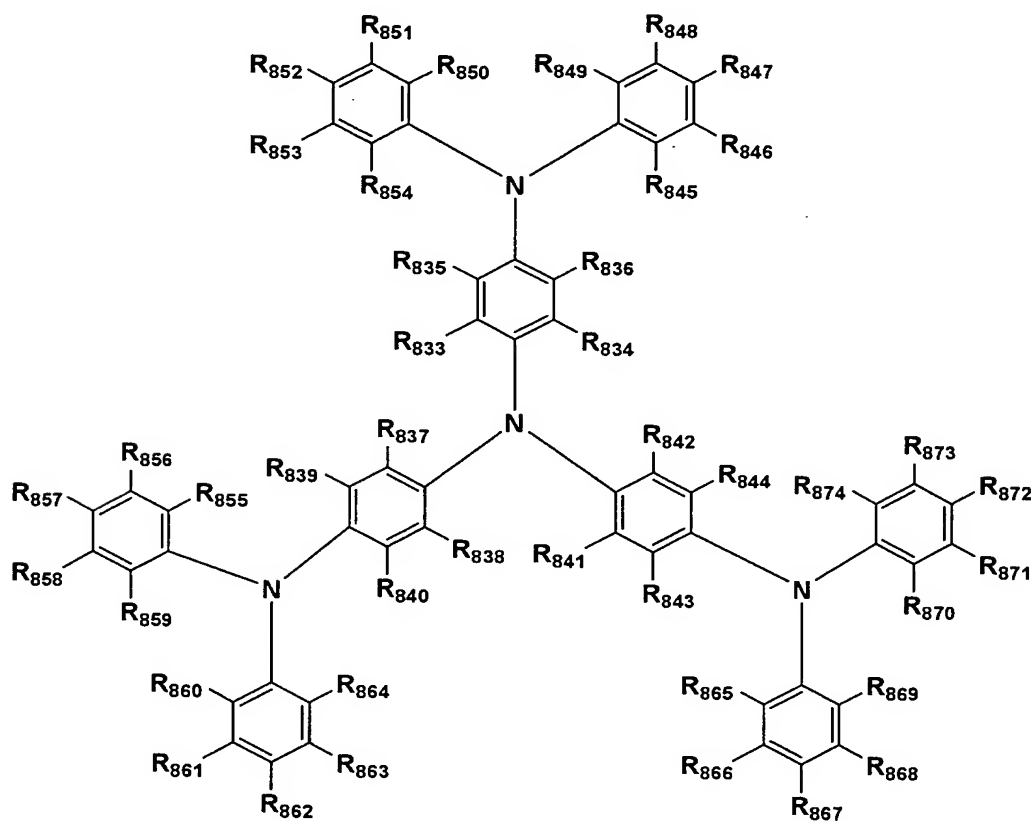
Formula 8



wherein X_5 and X_8 independently represent N or C- R_{501} in which R_{501} represents a hydrogen atom or a substituent, provided that at least one of X_5 and X_6 represents C- R_{501} in which R_{501} represents a substituent, and at least one of X_7 and X_8 represents C- R_{501} in which R_{501} represents a substituent.

25. The organic electroluminescent element of claim 18, wherein the triarylamine compound is a compound represented by the following formula 9,

Formula 9

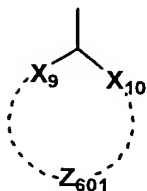


wherein R_{833} through R_{874} independently represent a hydrogen atom or a substituent, provided that at least one of R_{833} and R_{834} is a substituent, at least one of R_{835} and R_{836} is a substituent, at least one of R_{837} and R_{838} is a substituent, at least one of R_{839} and R_{840} is a substituent, at least one of

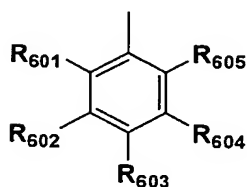
R₈₄₁ and R₈₄₂ is a substituent, and at least one of R₈₄₃ and R₈₄₄ is a substituent.

26. The organic electroluminescent element of claim 18, wherein the triarylamine compound comprises a terminal group represented by the following formula 10-1, 10-2, 10-3 or 10-4,

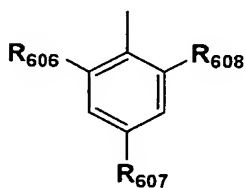
Formula 10-1



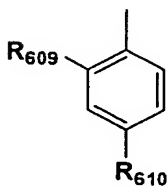
Formula 10-2



Formula 10-3



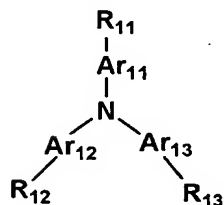
Formula 10-4



wherein X_9 and X_{10} independently represent N, O, S or CR_{611} in which R_{611} represents a hydrogen atom or a substituent, provided that at least one of X_9 and X_{10} represents CR_{611} in which R_{611} represents a substituent; Z_{601} represents an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring; R_{601} through R_{605} independently represent a hydrogen atom or a substituent, provided that at least one of R_{601} and R_{605} is a substituent; and R_{606} through R_{610} independently represent a substituent.

27. An organic electroluminescent element comprising a light emission layer containing a phosphorescent compound and a hole transporting layer adjacent thereto containing a hole transporting material, wherein the hole transporting material is a triarylamine compound represented by the following formula 1,

Formula 1

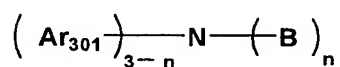


wherein Ar_{11} through Ar_{13} independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; R_{11} through R_{13} independently

represent a hydrogen atom or a substituent, provided that at least one of R_{11} through R_{13} is a substituent.

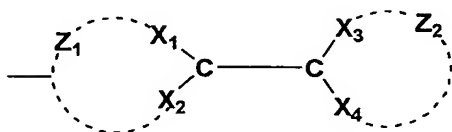
28. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 2,

Formula 2



wherein Ar_{301} represents a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; n is an integer of from 1 to 3; and B represents the following formula 3,

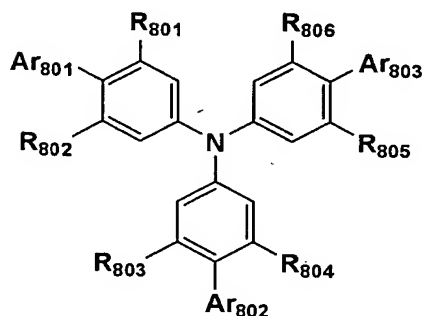
Formula 3



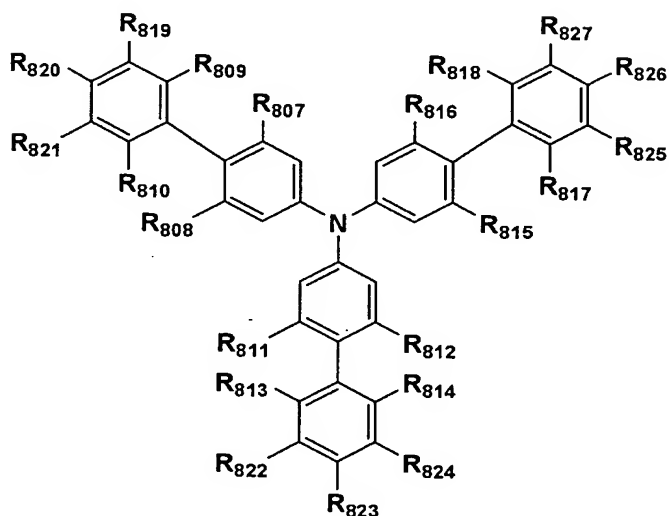
wherein Z_1 and Z_2 independently represent an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring; and X_1 through X_4 independently represent N, O, S or C- R_{301} in which R_{301} represents a hydrogen atom or a substituent, provided that at least one of X_1 through X_4 represents C- R_{301} in which R_{301} represents a substituent.

29. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 4-1 or 4-2,

Formula 4-1



Formula 4-2

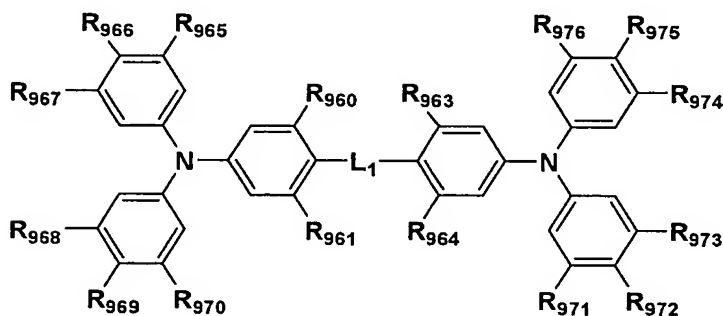


wherein Ar₈₀₁ through Ar₈₀₃ independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; and R₈₀₁ through R₈₂₇ independently represent a hydrogen atom or a substituent,

provided that at least one of R_{801} and R_{802} is a substituent, at least one of R_{803} and R_{804} is a substituent, at least one of R_{805} and R_{806} is a substituent, at least one of R_{807} through R_{810} is a substituent, at least one of R_{811} through R_{814} is a substituent, and at least one of R_{815} through R_{818} is a substituent.

30. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 5,

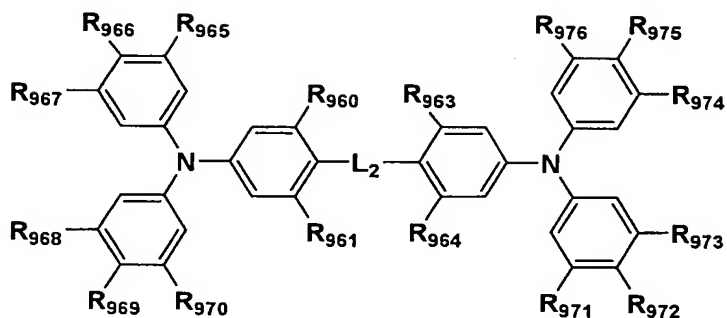
Formula 5



wherein R_{960} through R_{976} independently represent a hydrogen atom or a substituent, provided that at least one of R_{960} and R_{961} is a substituent, and at least one of R_{963} and R_{964} is a substituent; and L_1 represents a chemical bond or a divalent linkage group.

31. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 6,

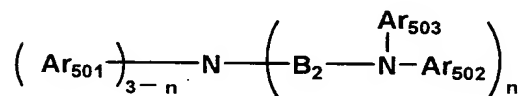
Formula 6



wherein R_{960} through R_{976} independently represent a hydrogen atom or a substituent; and L_2 represents an alkylene group, a cycloalkylene group or a fluoroalkylene group.

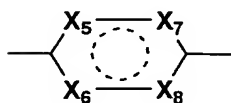
32. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 7,

Formula 7



wherein Ar_{501} through Ar_{503} independently represent a substituted or unsubstituted aryl group or a substituted or unsubstituted heteroaryl group; n is an integer of from 1 to 3; and B_2 represents the following formula 8,

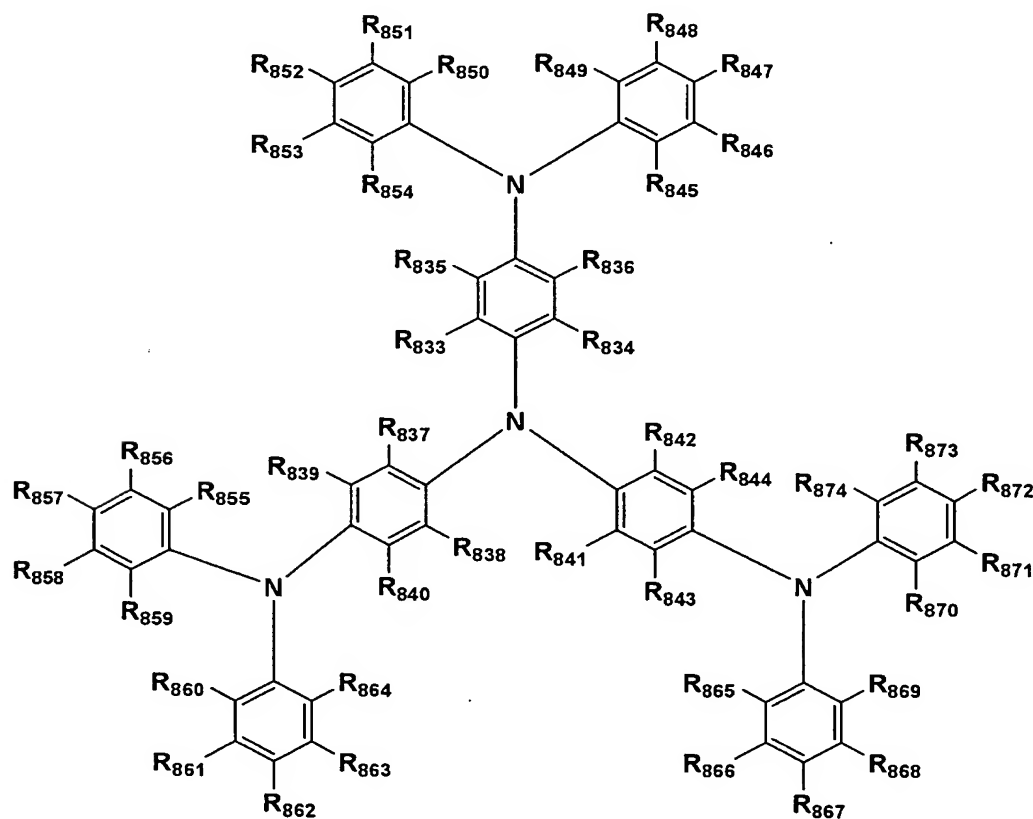
Formula 8



wherein X_5 and X_8 independently represent N or C- R_{501} in which R_{501} represents a hydrogen atom or a substituent, provided that at least one of X_5 and X_6 represents C- R_{501} in which R_{501} represents a substituent, and at least one of X_7 and X_8 represents C- R_{501} in which R_{501} represents a substituent.

33. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound represented by the following formula 9,

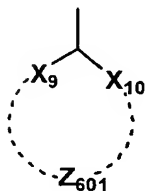
Formula 9



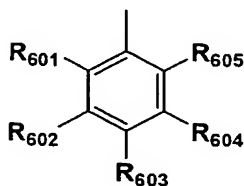
wherein R_{833} through R_{874} independently represent a hydrogen atom or a substituent, provided that at least one of R_{833} and R_{834} is a substituent, at least one of R_{835} and R_{836} is a substituent, at least one of R_{837} and R_{838} is a substituent, at least one of R_{839} and R_{840} is a substituent, at least one of R_{841} and R_{842} is a substituent, and at least one of R_{843} and R_{844} is a substituent.

34. The organic electroluminescent element of claim 27, wherein the triarylamine compound is a compound having a terminal group represented by the following formula 10-1, 10-2, 10-3 or 10-4,

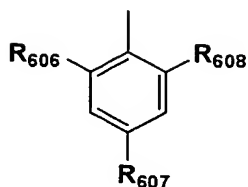
Formula 10-1



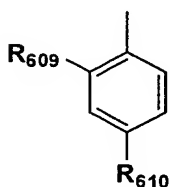
Formula 10-2



Formula 10-3



Formula 10-4



wherein X_9 and X_{10} independently represent N, O, S or CR_{611} in which R_{611} represents a hydrogen atom or a substituent, provided that at least one of X_9 and X_{10} represents CR_{611} in which R_{611} represents a substituent; Z_{601} represents an atomic group necessary to form an aromatic hydrocarbon ring or an aromatic heterocyclic ring; R_{601} through R_{605} independently represent a hydrogen atom or a substituent, provided that at least one of R_{601} and R_{605} is a substituent; and R_{606} through R_{610} independently represent a substituent.

35. The organic electroluminescent element of claim 27, wherein the hole transporting material has a molecular weight of not less than 550.

36. The organic electroluminescent element of claim 27, wherein the hole transporting material has an ionization potential I_{p1} of from 5.00 to 5.70 eV.

37. The organic electroluminescent element of claim 27, wherein

$$-0.1 \text{ (eV)} \leq I_{p3} - I_{p1} \leq 0.5 \text{ (eV)}$$

where I_{p1} (eV) represents the ionization potential of the hole transporting material, and I_{p3} (eV) represents the ionization potential of the phosphorescent compound.

38. The organic electroluminescent element of claim 27, wherein

$$0.5 \text{ (eV)} < T3 - E_{a1} < 1.3 \text{ (eV)}$$

where $T3$ (eV) represents the excited triplet energy level of the phosphorescent compound and E_{a1} (eV) represents the electron affinity of the hole transporting material.

39. The organic electroluminescent element of claim 27, wherein the phosphorescent compound has a phosphorescence maximum in the wavelength regions of from 380 to 480 nm.

40. The organic electroluminescent element of claim 27, further comprising a second hole transporting layer containing a second hole transporting material, the second hole transporting layer being provided on the surface of the

hole transporting layer opposite the light emission layer,
wherein

$$0.1 \text{ (eV)} < I_{p1} - I_{p4} < 0.7 \text{ (eV)}$$

where I_{p1} (eV) represents the ionization potential of the hole transporting material, and I_{p4} (eV) represents the ionization potential of the second hole transporting material.

41. The organic electroluminescent element of claim 40, wherein the thickness of the hole transporting layer adjacent to the light emission layer is from 5 to 20 nm.

42. The organic electroluminescent element of claim 27, wherein the light emission layer further contains a host compound.

43. The organic electroluminescent element of claim 27, wherein

$$0.3 \text{ (eV)} < I_{p2} - I_{p1} < 1.0 \text{ (eV)}$$

where I_{p1} (eV) represents the ionization potential of the hole transporting material and I_{p2} (eV) represents the ionization potential of the host compound.

44. The organic electroluminescent element of claim 27, wherein

$$0.1 \text{ (eV)} < E_{a2} - E_{a1} < 0.8 \text{ (eV)}$$

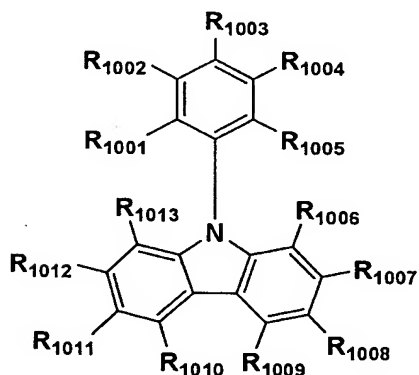
where E_{a1} (eV) represents the electron affinity of the hole transporting material and E_{a2} (eV) represents the electron affinity of the host compound.

45. The organic electroluminescent element of claim 27, wherein the host compound has a 0-0 band of the phosphorescence spectra of from 300 to 450 nm.

46. The organic electroluminescent element of claim 27, wherein the host compound is a carbazole derivative.

47. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 11,

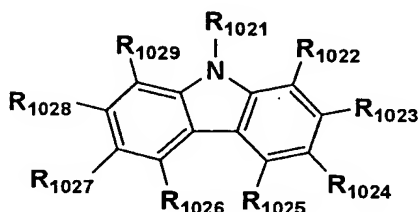
Formula 11



wherein R_{1001} through R_{1013} independently represent a hydrogen atom or a substituent, provided that at least one of R_{1001} through R_{1013} is a substituent.

48. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 12,

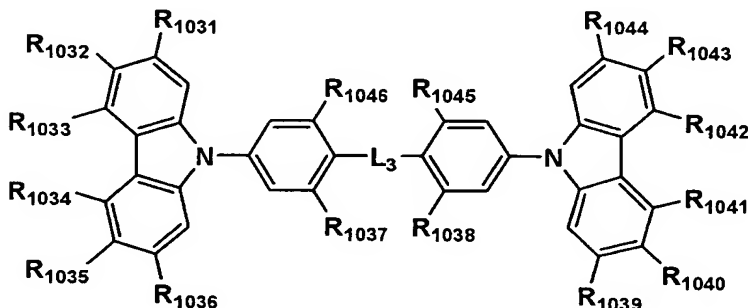
Formula 12



wherein R_{1021} represents an alkyl group, a cycloalkyl group or a fluoroalkyl group; and R_{1022} through R_{1029} independently represent a hydrogen atom or a substituent, provided that at least one of R_{1022} through R_{1029} is a substituent.

49. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 13,

Formula 13

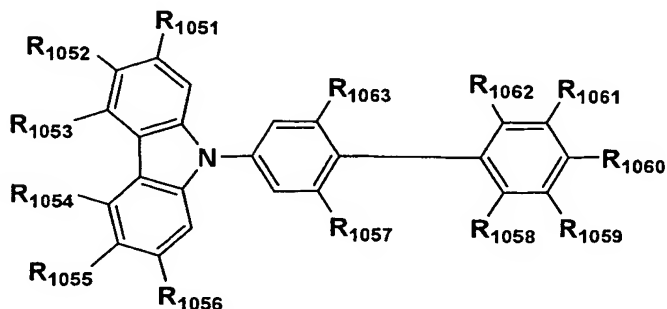


wherein R_{1031} through R_{1046} independently represent a hydrogen atom or a substituent; and L_3 represents a chemical bond or a

divalent linkage group, provided that when L_3 represents a chemical bond, at least one of R_{1037} , R_{1038} , R_{1045} , and R_{1046} is a substituent.

50. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 14,

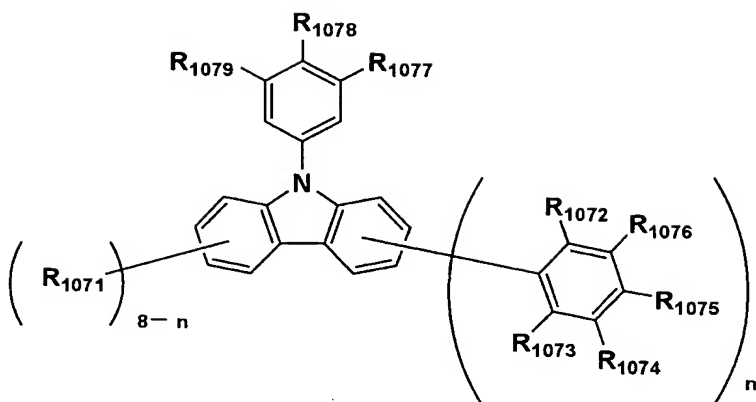
Formula 14



wherein R_{1051} through R_{1063} independently represent a hydrogen atom or a substituent, provided that at least one of R_{1057} , R_{1058} , R_{1062} , and R_{1063} is a substituent.

51. The organic electroluminescent element of claim 46, wherein the carbazole derivative is a compound represented by the following formula 15,

Formula 15



wherein R_{1071} through R_{1079} independently represent a hydrogen atom or a substituent, provided that at least one of R_{1072} and R_{1073} is a substituent; and n is an integer of from 1 to 8.

52. The organic electroluminescent element of claim 1, wherein the hole transporting layer is formed according to a vacuum deposition process.

53. The organic electroluminescent element of claim 1, wherein the hole transporting layer is formed according to a wet process.

54. A display comprising the organic electroluminescent element of claim 1.

55. An illuminator comprising the organic electroluminescent element of claim 1.

56. A display comprising the illuminator of claim 55, and a liquid crystal element as a displaying means.